Instream Flows for Riverine Stewardship

John Kauffman

Va. Dept Game and Inland Fisheries

Public Trust Doctrine

Public Trust Doctrine responsibilities must be among the fundamental guiding principles of water management programs.

Recognizing Legal Authorities

Clear recognition of legal authorities to protect, enhance and restore instream flows for Public Trust resources is a key component of effective water management programs.

Virginia recreational fishing economy

- 888,000 Participants –fresh and saltwater
- Fished 12,380,000 days
- Economic output of $735 Million
- 6,824 Jobs related to fishing economy

USFWS 2001 Virginia survey of fishing, hunting and wildlife associated recreation

Local economies

- Spring 2002 survey conducted by DGIF to assess the spring fishery of James and Rappahannock Fall line
- Rappahannock anglers spent $158,000
- James anglers spent $169,000

Resource management

- Regulations
- Habitat management – protection, enhancement and or restoration

Ecosystem components

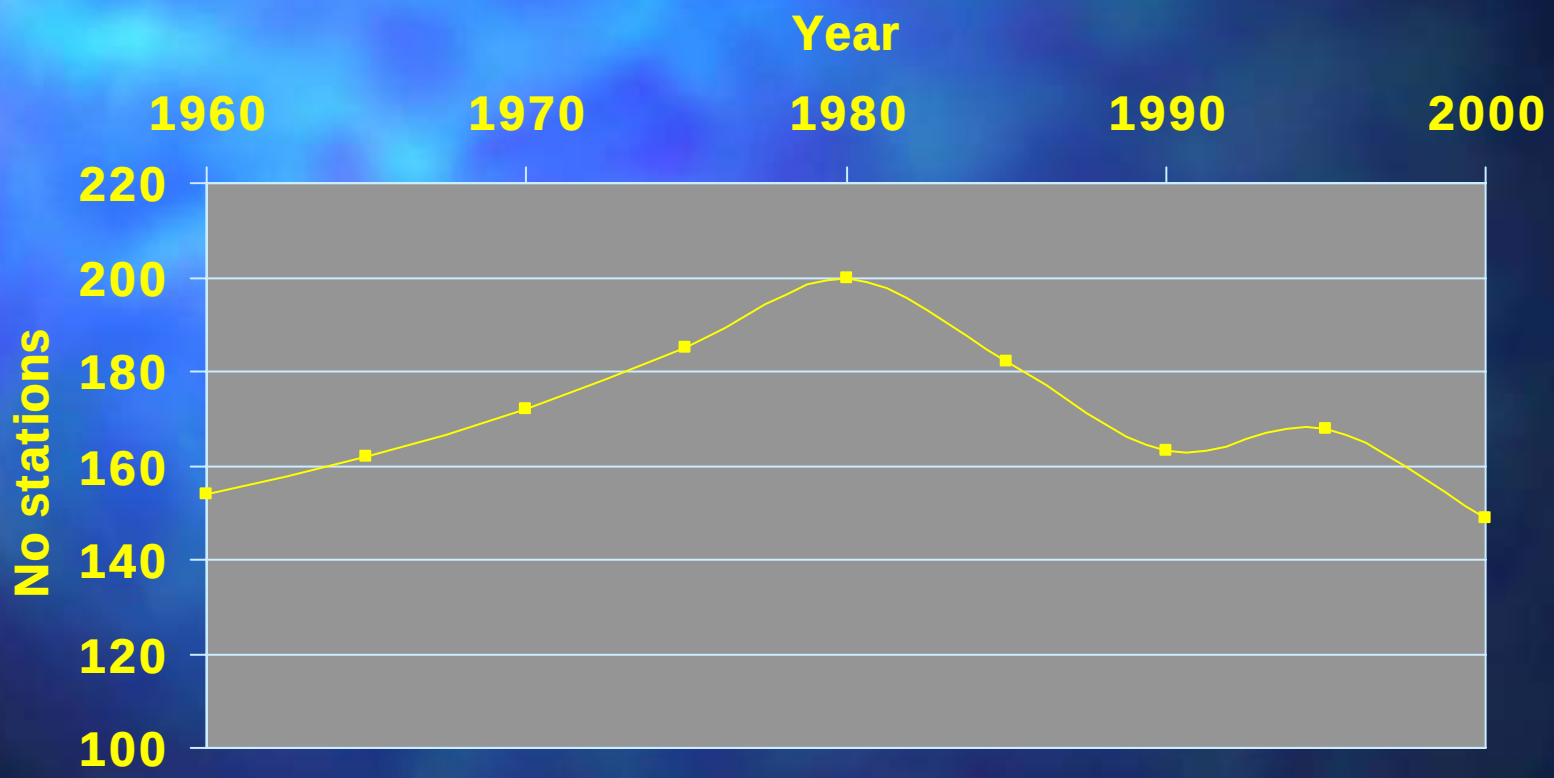
- Hydrology
- Geomorphology
- Biology
- Water quality
- Connectivity

- No universal method appropriate for flow regimes in all streams
- A combination of methods is needed to address all ecosystem components
- Combination of methods is a case by case basis for each water

Hydrology

- Indicators of hydrologic alteration
- Range of variability approach

VA STREAM GAGING STATIONS



Geomorphology tools

- Channel maintenance in gravel streams
- Flushing flows - empirical, sediment transport, office methods
- Hydrologic Engineering Center-6
- Hydrologic Engineering Center- RAS
- Geomorphic stream classification

Bankfull conditions

- Picture of James River
- 45,000 cfs at Scottsville
- Condition occurs about every 1.5 years
- Necessary for creating habitat and ensuring stream size appropriate for high flow events

Habitat creation

- Result often times from catastrophic events
- Large woody debris deposited in stream creates cover as well as velocity shelter
- Provides resting area next to higher velocity areas that move food downstream

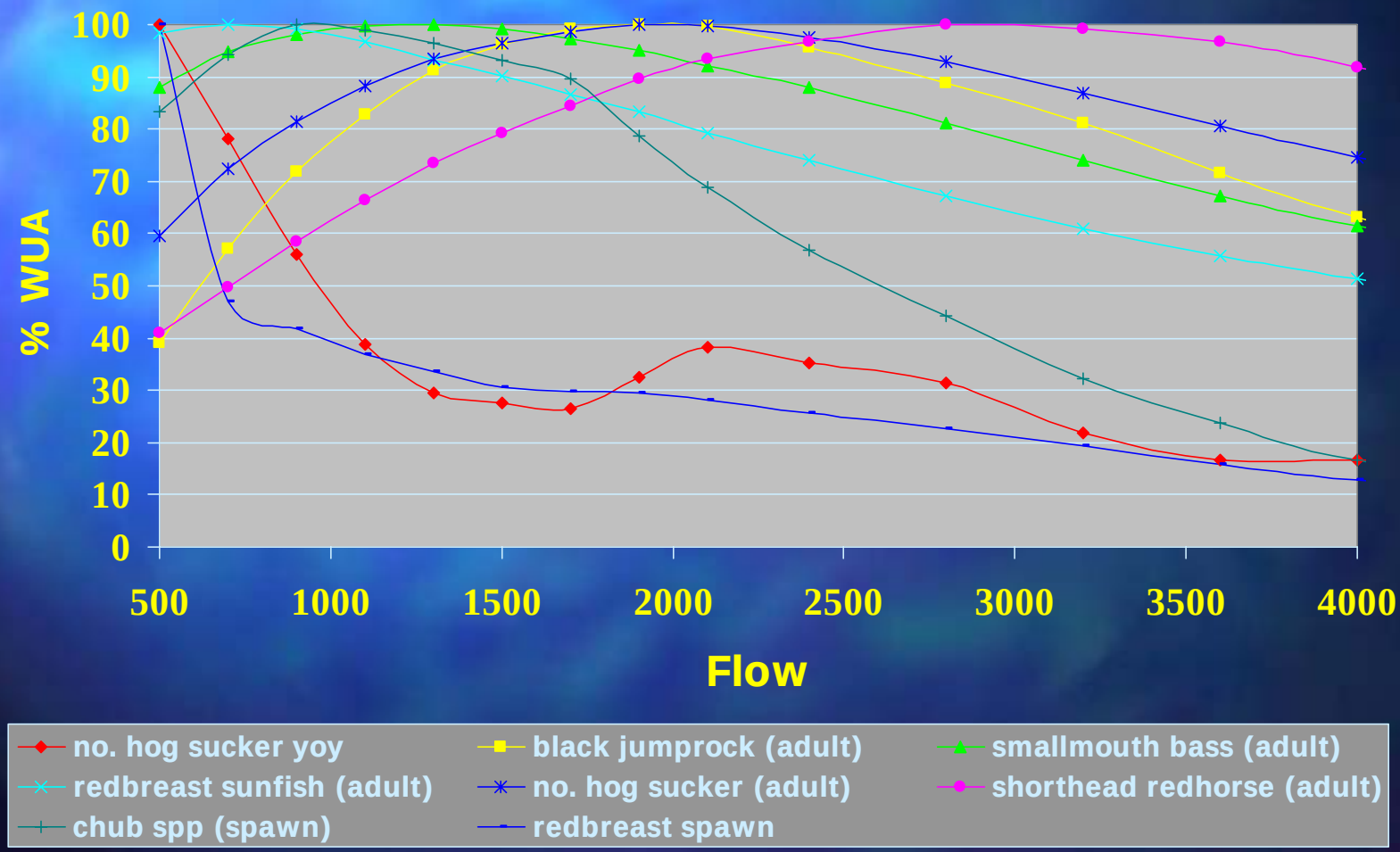
Biology

- 2-D Models
- Aquatic base flow
- Biological response regressions
- Feeding station
- Flow duration curve
- Index of biotic integrity

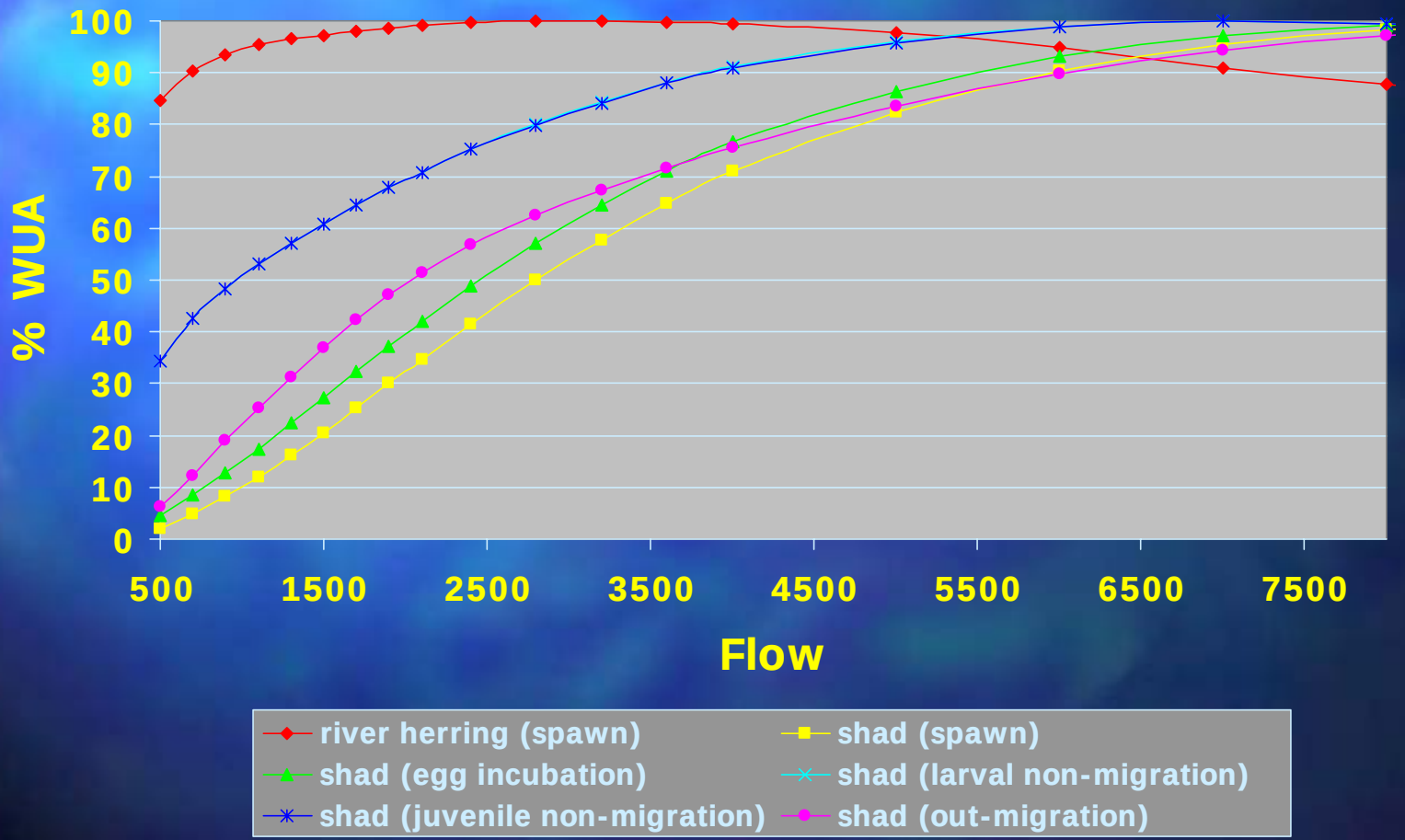
Biology -cont.

- PHABSIM
- RCHARC
- R2-Cross
- Tennant
- Toe width
- Wetted perimeter

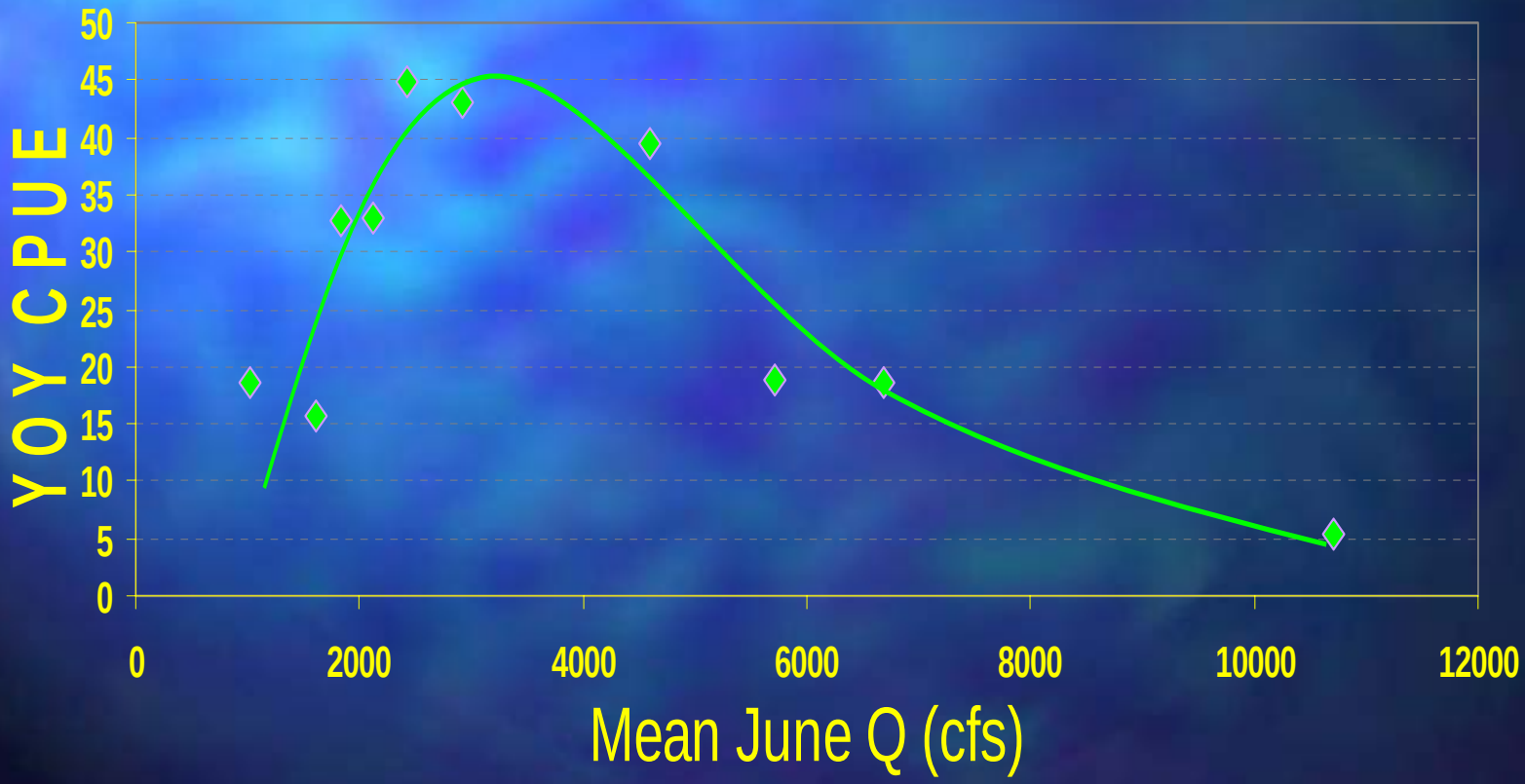
Coolwater habitat



Alosid habitat



James River – Smallmouth Flow / Recruitment Curve



Water Quality

- QUAL2E
- SS/SNTEMP
- TMDL
- 7Q10

Do not use $7Q_{10}$ (or $7Q_2$) as an instream standard!

Connectivity

- Lateral - with the floodplain
- Longitudinal along the length
- Temporal
- Vertical with the groundwater

Connectivity tools

- Plunge pool
- Migration cue
- Salmon barrier
- Floodplain inundation
- Tidal distributary/estuary

Opportunities

- Additional gaging stations needed
- Need to recognize connectivity between surface and groundwater
- Need to address cumulative losses
- Agriculture and existing sites
- Additional biological studies

Quality program

- State agencies have public trust responsibilities
- Work with legal and institutional factors
- Involve the public
- Interdisciplinary approach

Quality program cont.

- Follow systematic problem solving approach
- Assessment tools appropriate for problem
- Document your process
- Use adaptive management
- Seek to restore ecological function

Final IFC document

- Check website
- www.instreamflowcouncil.org